SECTION 710
PAINTS

710.01 PIGMENTS, VEHICLES, AND THINNERS. Assure all materials from which paints are made and formulated meet the following specifications:

(1) Zinc Oxide Pigments ..... ASTM D 79
(2) Pure Chrome Green Pigments ..... ASTM D 212
(3) Iron Blue Pigments ..... ASTM D 261
(4) Calcium Carbonate Pigments ..... ASTM D 1199
(5) Titanium Dioxide Pigments ..... ASTM D 476
(6) Bone Black Pigment ..... ASTM D 210
(7) Carbon Black Pigment ..... ASTM D 561
(8) Black Synthetic Iron Oxide Pigment ..... ASTM D 769
(9) Red and Brown Iron Oxide Pigments ..... ASTM D 3722
(10) Ochre (Ferrous earthy pigments) ..... ASTM D 85
(11) Raw and Burnt Umber Pigments ..... ASTM D 763
(12) Raw and Burnt Sienna Pigments ..... ASTM D 765
(13) Copper Phtalocyanine Blue Pigment ..... ASTM D 963
(14) Iron Blue Pigment ..... ASTM D 261
(15) Ultramarine Blue Pigments ..... ASTM D 262
(16) Chrome Oxide Green Pigment ..... ASTM D 263
(17) Chrome Yellow and Chrome Orange Pigments . ASTM D 211
(18) Yellow Iron Oxide Pigment-Hydrated ..... ASTM D 768
(19) Aluminum Pigments ..... ASTM D 962
(20) Zinc Dust (pigment) ..... ASTM D 520
(21) Magnesium Silicate Pigments ..... ASTM D 605
(22) Diatomaceous Silica Pigments ..... ASTM D 604
(23) Mica Pigment ..... ASTM D 607
(24) Raw Linseed Oil ..... ASTM D 234
(25) Boiled Linseed Oil ..... ASTM D 260
(26) Spirits of Turpentine ..... ASTM D 13
(27) Petroleum Spirits (Mineral Spirits) ..... ASTM D 235
(28) Lampblack Pigments ..... ASTM D 209
(29) Liquid Paint Driers ..... ASTM D 600
(30) Raw Tung Oil ..... ASTM D 12

710.02 PAINTS AND ENAMELS.

A. General. Follow the paint manufacturers recommendations including but not limited to storage, application, thinning, safety precautions, and film thickness unless otherwise specified.

Furnish all paints under this Section free of lead, or zinc chromate unless specified.

Provide the manufacturer's Product Safety Data Sheets. Supply the paint in the original container labeled with the manufacturer's name, address, paint type, formula identification, date of manufacture, and lot or batch number.

Paints for Structural Steel where multiple coats are applied must be produced by the same manufacturer. Provide the Project Manager certified test results from an independent testing facility showing the following paints supplied meet the applicable requirements.

B. Paints for Miscellaneous Metals. Use the following paints on metal unless otherwise specified.

1. **Foliage Green Bridge Paint.** Furnish foliage green paint meeting AASHTO M 67 requirements.
2. **Aluminum Paint, Ready-Mixed**. Furnish aluminum paint meeting AASHTO M 260 (Type II, Leafing Finish).
3. **Aluminum Epoxy Paint.** Furnish aluminum epoxy paint that is a self-priming, two-component, high build, aluminum filled epoxy mastic. The paint must adhere to metal surfaces and existing painted surfaces when the surface is prepared following the paint manufacturer's recommendations.

   Apply the coating following all the manufacturer's recommendations to produce a minimum 5 mil (125 μm) dry film thickness.

   Meet the following minimum paint composition requirements:

Solids	90% ± 2% by volume (ASTM D 2697)
Pigment	19% by volume
Vehicle	66% by volume
Percent non-volatile vehicle	74%
Nominal VOC	0.74 lbs/gal.(89.1 grams/liter)

   The mixed paint must weigh between 11-12 pounds per gallon (1.3 to 1.4 kg per liter) when measured under ASTM D 1475 at 75 plus or minus 2 °F (24 ± 1 °C).

   The mix ratio of the two components must be 1:1 by volume and have a minimum pot life of 4 hours at 75 °F (24 °C) when thinned following the manufacturer's recommendations.
4. **Epoxy paint for pipe pile.** Furnish epoxy paint that is a two-component, self-priming epoxy coating meeting the following requirements:

Drying Time @ 75 °F (24 °C)	
To Touch	2 hrs max.
To Cure	10 days max.
Pot Life @ 70 °F (21 °C)	12 hrs min.
Abrasion Resistance (ASTM D 4060; CS-17 wheel, 1,000 Gram load, 1,000 cycles)	170 mg loss, max.
Direct Impact Resistance (ASTM D 2794)	60 in. lbs. min. (6.8 N·m/min)

   Salt Fog: No blistering, cracking, or film delamination when tested under ASTM B 117 for 1,500 hours.

   Moisture Condensation Resistance: No blistering, cracking, or film delamination when tested under ASTM D 2247 for 1,000 hours.

5. **Equipment Enamel.** Furnish equipment enamel that is formulated using Federal Specification TT-E-489b, class A, spray or brush consistency as specified in the Contract. Match the appropriate color chip, available from the Materials Bureau. Meet the thinner requirements of Federal Specification TT-T306. Use at a maximum rate of 1 pint per gallon (0.12 L per L) when required.
6. **White, Yellow, and Black Enamel.** Furnish water resistant enamels made from synthetic gums capable of brush application to vertical metal surfaces without running, streaking, or sagging. Meet the following requirements:

	White	Yellow	Black
Coarse particles and skins retained on No.325 sieve, max (45 μm)	0.50%	0.50%	0.50%
Nonvolatile matter, min	85%	85%	85%
Dry to touch at 70°F (21°C) time in hours, Max.	5	5	5
Dry hard at 70°F (21°C) time in hours, Max.	24	24	24
Toughness, Kauri reduction test at 75°F (24°C), min.	150%	150%	150%
Hiding power, square feet per gallon (m^2 per L) by Pfund cryptometer Model E, Black plates, min.	300 (7.3)	450 (11)	

Meet Federal Test Method Standard No. 141C for whitening, dulling, or change in color; brushing, flowing, covering, and leveling properties.

The white enamel must be equal in brightness to Rutile (Type IV) Titanium Dioxide Pigment.

Yellow enamel must match standard color sample for D-2 yellow guardrail paint. Black enamel must be jet black and cover completely in one coat.

7. **Zinc Phosphate Paint.** Zinc Phosphate Paint may be used as a primer or finish coat unless otherwise specified. Provide the finish paint color specified in the Contract and match the appropriate color chip, available upon request. The paint must:
   a. Be well-ground;
   b. Show no skinning in a freshly opened, full can;
   c. Not cake or settle in the container;
   d. Readily break up with a paddle to a smooth, uniform consistency;
   e. Brush easily, possess good leveling qualities;
   f. Dry to a hard uniform finish.

   The paint composition must meet the following requirements:

	Min.	Max.
Pigment[4]	56.5%	58.5%
Vehicle[5]	41.5%	43.5%

	Min.	Max.
Pigment Composition:		
Zinc Phosphate	60.0%	—
Titanium Dioxide[6] (Rutile)	13.0%	—
Calcium Carbonate	21.4%	—
Vehicle Composition:		
Alkyd Phthalic Resin (50% Solids)	52.4%	—
Raw Linseed Oil	26.2%	—
Mineral Spirits	17.2%	—
Driers and Additives	4.2%	—
Finished Paint:		
Consistency (Krebs-Stormer)[1]	70KU	83KU
Weight Per Gallon[2]	(5.7 kg) 12.6 lbs.	—
Dry To Touch[3]	—	8 Hrs.
Dry To Handle[3]	—	16 Hrs.
Dry Film Thickness	1.0 mil	—

[1]By ASTM D-562, [2]By ASTM D-1475, [3]Federal Test Method Standards 141C Method 4061.2, [4]Federal Test Method No. 141-Method 4021, [5]Federal Test Method No. 141-Method 4051, [6]ASTM D 1394

710.02.3 Paint Coating Systems for Structures.

A. Epoxy Zinc Rich Primer. Meet AASHTO M 300 type I or II requirements excluding those in section 4.7.

B. Intermediate Coat. Use a two-component polyamide epoxy meeting the following requirements:

Drying Time @ 50 °F (10° C)
To Touch ..... 4 hrs max.
Tack Free ..... 24 hrs max.
Cure ..... 14 Days max.

Pot Life @ 50° (10 °C) ..... 10 hrs min.
Abrasion Resistance ..... 224 mg max. loss
(ASTM D 4060, CS-17 wheel, 1,000 cycles)
Direct Impact Resistance ..... 120 in. lbs.
(13.6 N·m min.)

Salt Fog: No blistering, softening, cracking or film delamination when tested under ASTM B 117 for 1,000 hours.
Moisture Condensation Resistance: No blistering, rusting or delamination when tested under ASTM D 2247 for 1,000 hrs. at 100 °F (37 °C).

C. Finish Coat. Provide a two component finish epoxy meeting the following requirements:

Drying Time @ 50 °F (10 °C)
To Touch ..... 10 hrs. max.
Tack Free ..... 24 hrs. max.
Cure ..... 14 Days max.

Pot Life @ 50 °F (10 °C) ..... 10 hrs. min.
Abrasion Resistance ..... 224 mg. max. loss
(ASTM D 4060, CS-17 wheel, 1,000 cycles)
Impact Resistance ..... 120 in. lbs.
(6714 mm kg min.)

Salt Fog: No blistering, softening, cracking or film delamination when tested under ASTM B 117 for 1,000 hours.
Moisture Condensation Resistance: No blistering, rusting or delamination when tested under ASTM D 2247 for 1,000 hours at 100 °F (37 °C).